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Publication date:
1995

Document version
Early version, also known as pre-print

Citation for published version (APA):
Hansen, T. B., Jørgensen, F., & Knøchel, S. (1995). *Heat-shock induced thermotolerance in Listeria Monocytogenes: the effect of pH and growth phase*. Abstract from New shelf-life technologies and safety assessments, Helsinki, Finland.

VTT SYMPOSIUM 148

New shelf-life technologies
and safety assessments



TECHNICAL RESEARCH CENTRE OF FINLAND
ESPOO 1995

HEAT-SHOCK INDUCED THERMOTOLERANCE IN *LISTERIA MONOCYTOGENES*: THE EFFECT OF PH AND GROWTH PHASE

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Abstract

Several studies have shown that slowly rising temperatures as well as heat shock increase the heat resistance of *Listeria monocytogenes*. Working in a minced beef system, we could not observe this effect in many cases and, therefore, we investigated the magnitude of heat-shock (46°C, 30 min) induced thermotolerance at 60°C as a function of growth phase and pH (5.4, 5.8, 6.2 and 7.0). The effect was compared in a broth and a minced beef system. The broth (tryptic phosphate broth) contained 90 mmol/l lactic acid to simulate conditions in beef and the pH in both broth and beef was adjusted to the appropriate levels with HCl and NaOH. The thermotolerance of *L. monocytogenes* was 4 to 5-fold higher in beef compared with broth but the relative influence of pH and heat-shock on thermotolerance was very similar in the two heat inactivation systems. Compared with exponentially growing cells late stationary phase cells showed the highest thermotolerance but only little or no increase in thermotolerance was observed in these cells upon heat-shock. At low pH (5.4) no effect of heat-shock on thermotolerance could be observed in exponentially growing cells. However, with increasing pH a gradual increase in heat-shock induced thermotolerance was observed in exponentially growing cells both in broth and beef.